2005 Air Quality Report

Calvin Ku

MACC Meeting

Kansas City, MO

September 29, 2005

6 Criteria Pollutants

- Ozone (O_3) - formed by reactions between Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx) under sunlight. Sources of VOCs & NOx are motor vehicles, power plants, auto manufacturing, and industrial sources.

- Fine Particulate Matter ($PM_{2.5}$) - very small particles consists of different species including ammonia, sulfate, nitrate, organic and inorganic carbon. Sources of $PM_{2.5}$ are vehicles, power plants, wood furnace, charcoal kilns, etc.

- Particulate Matter (PM_{10}) - larger particles directly emitted, such as dust from roads, quarries, and concrete plants.

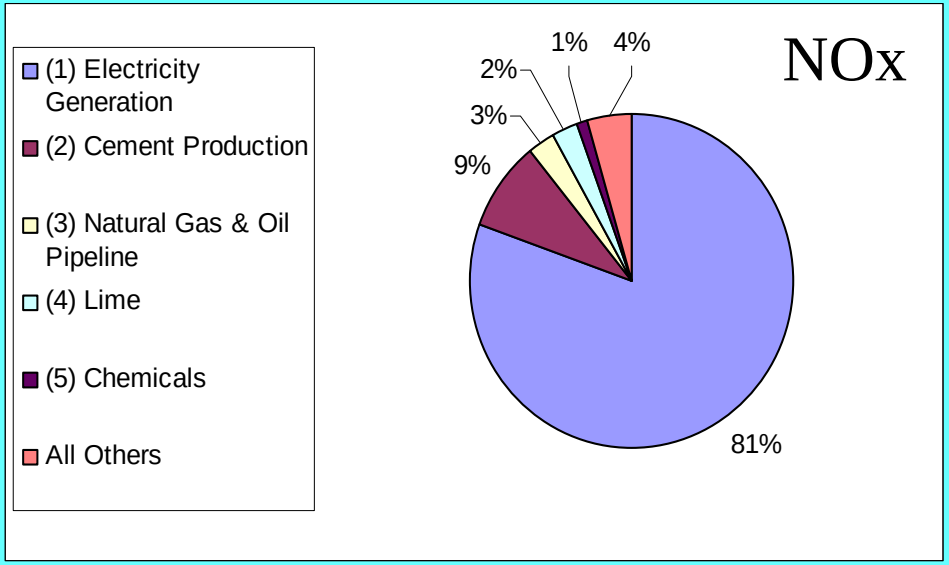
- Lead (Pb) - Mainly from lead smelters.

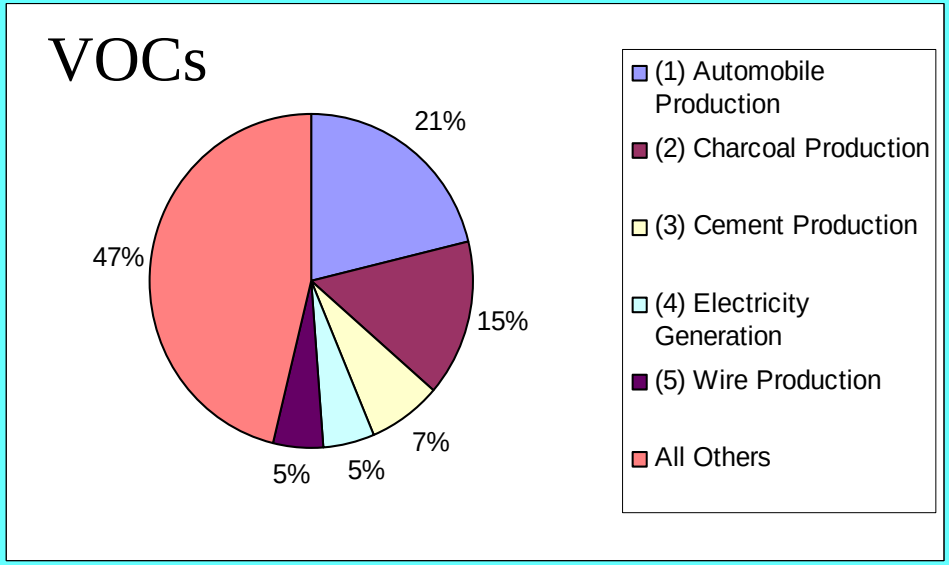
- Nitrogen Dioxide (NO_2) - sources include coal-fired boilers, mobile sources, and cement kilns.

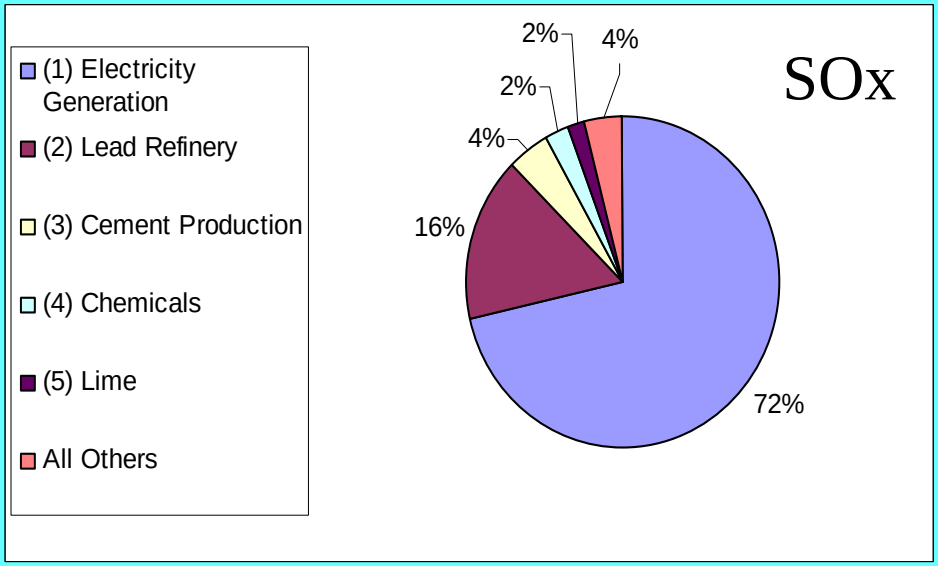
- Sulfur Dioxide (SO_2) - main sources are coal-fired boilers, lead smelters.

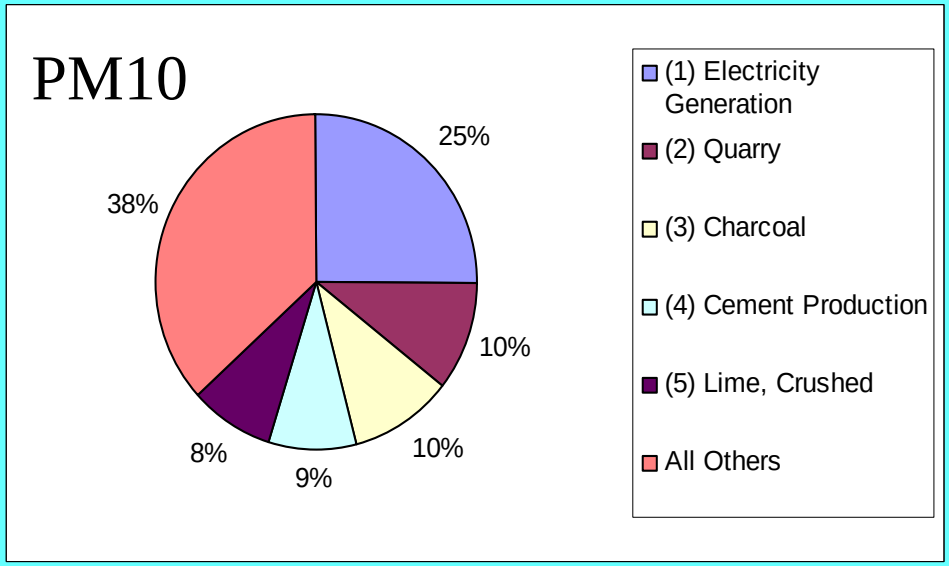
- Carbon Monoxide (CO) - incomplete combustion of fuel, motor vehicles.

Major Point Sources









Air Emissions by Source Category in St. Louis

NOx

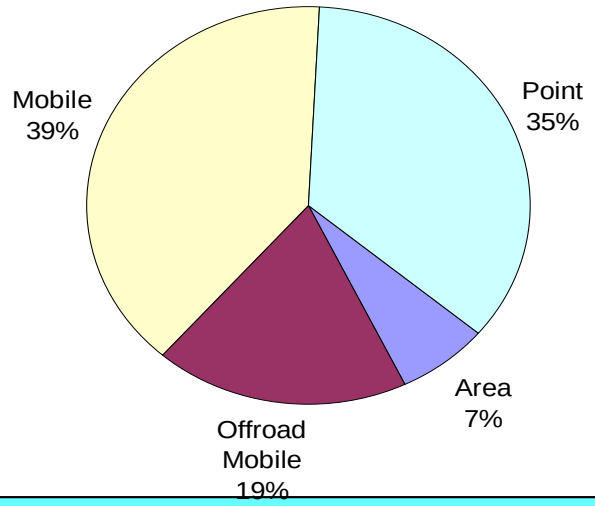


Figure 1

VOC

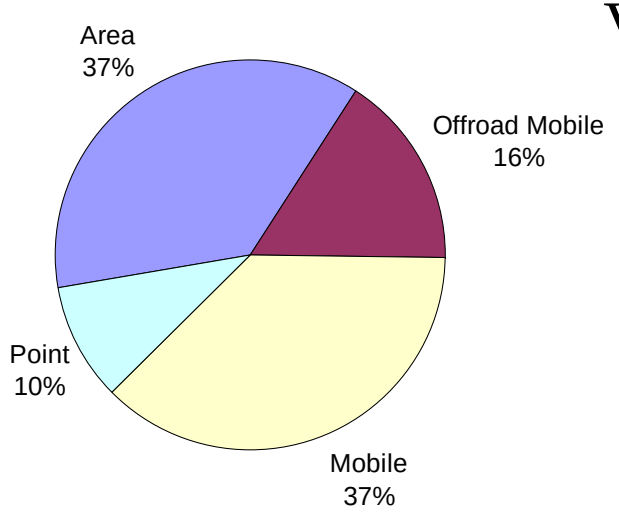


Figure 3

SOx

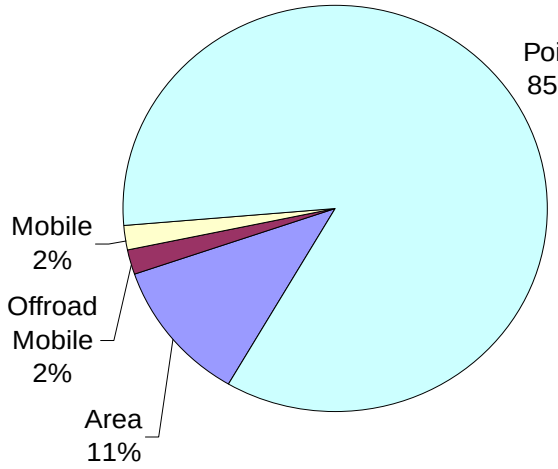


Figure 2

PM10

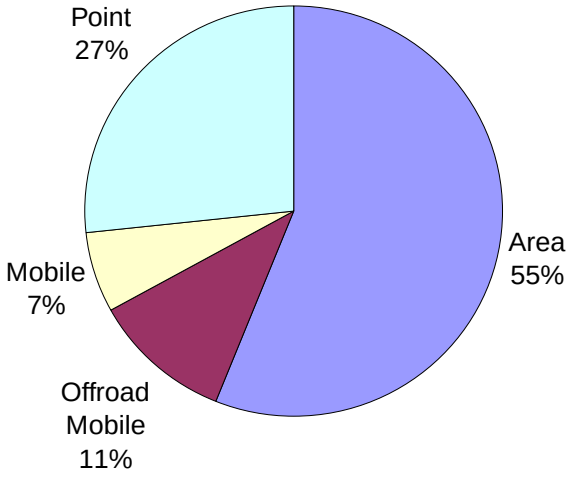
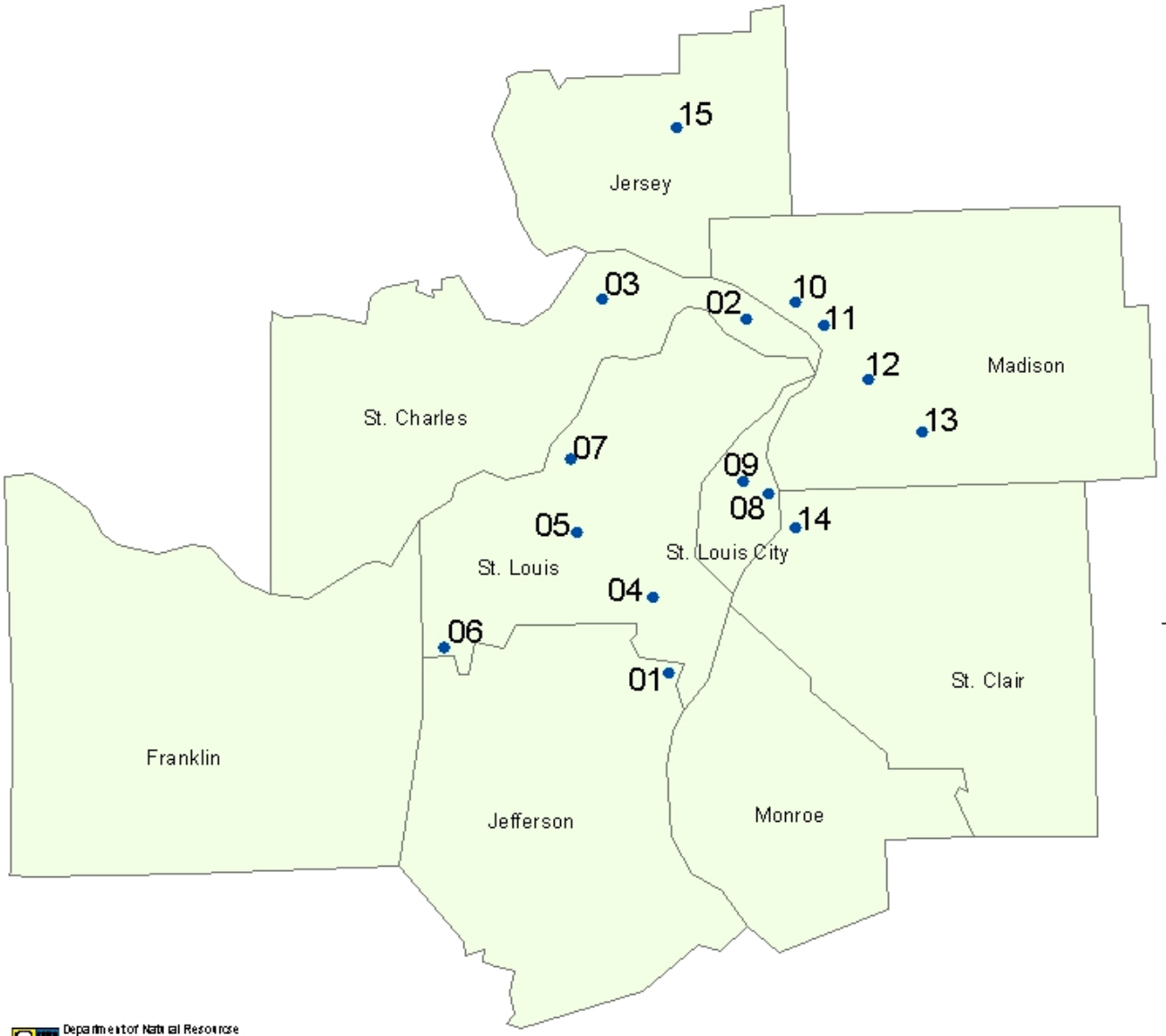


Figure 4

St. Louis Ozone Nonattainment Area Monitoring Sites, 2005



Missouri

01 Arnold
02 West Alton
03 Orchard Farm
04 Sunset Hills
05 Queeny Park
06 Pacific
07 Maryland Heights
08 Blair Street
09 Margaretta

Illinois

10 409 Main Street, Alton
11 200 W Division, Maryville
12 Poag Road, Edwardsville
13 54 N Walcott, Wood River
14 13th and Tudor, E St. Louis
15 Liberty St. & County, Jerseyville

N

Department of Natural Resources
Air & Land Protection Division
Air Pollution Control Program
(Patricia Mallro 03/29/05)

Ozone

Monitoring data collected by the APCP indicates that St. Louis continues to be in violation of the National Ambient Air Quality Standard (NAAQS) for 8-hr Ozone. The standard is 85 parts per billion (ppb), calculated by averaging the fourth highest value from three consecutive years.

- among current sites, eight sites were in violation in 2003 (01-03) and seven sites last year (02-04)

- only two sites are in violation this year (03-05)

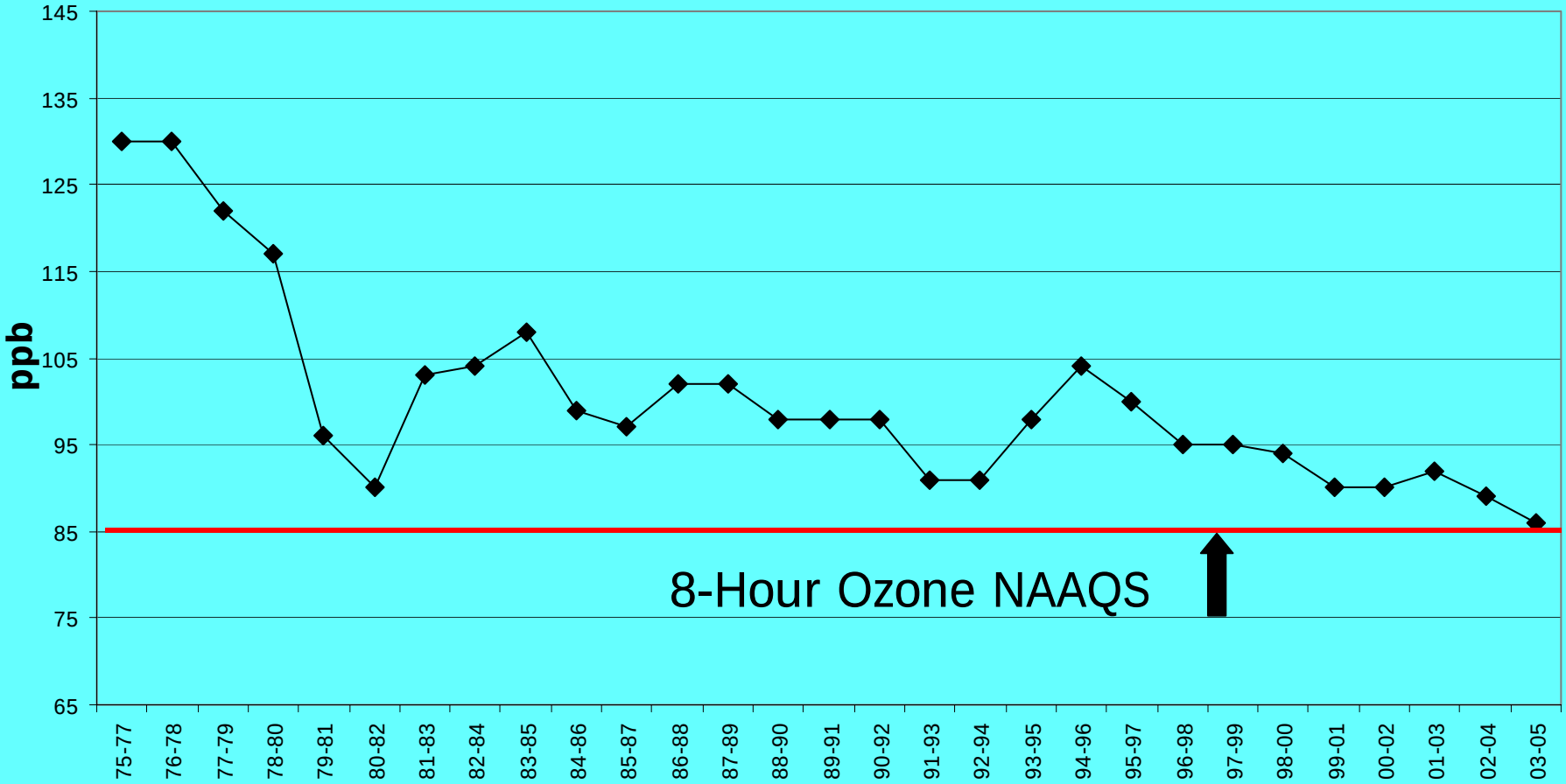
Orchard Farm	.086 ppm
West Alton	.085 ppm

St. Louis MSA 8-hour Design Values

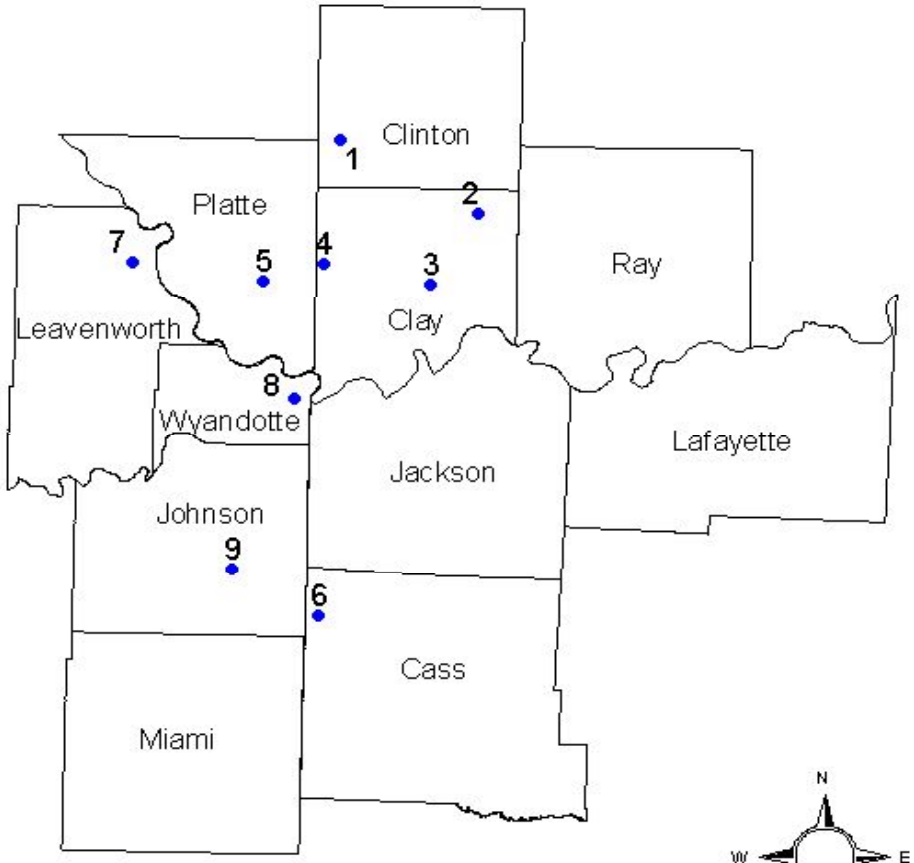
	4th High 8-hr Average (ppb)					Design Value		
Missouri	**2001**	**2002**	**2003**	**2004**	**2005**	**01-03**	**02-04**	**03-05**
Arnold	86	93	82	70	92	**87**	81	81
West Alton	85	99	91	77	89	**91**	**89**	**85**
Orchard Farm	88	98	90	76	92	**92**	**88**	**86**
Blair St.					89			
Margaretta	80	98	90	72	91	**89**	**86**	84
Sunset Hills	88	98	88	70	89	**91**	**85**	82
Queeny Park	84	94	86	67	82	**88**	82	78
Maryland Hts					88			
Pacific					87			
Bonne Terre	75	92	83	70	84	83	81	79
Foley					89			
Illinois								
Jerseyville	84	100	83	73	83	**89**	**85**	79
Alton	82	94	89	74	91	**88**	**85**	84
Maryville	73	90	88	78	88	83	**85**	84
Wood River	78	84	83	73	87	81	80	81
Houston	77	85	77	64	74	79	75	71
East St. Louis	78	93	79	73	94	83	81	82

St. Louis MSA 8-hr Ozone Design Values

Design Value of Highest Site for Each 3-yr Period

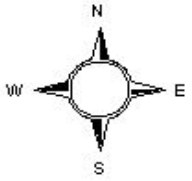


Kansas City Area Ozone Monitoring Sites



Missouri
01 Trimble
02 Watkins Mill
03 Liberty
04 Rocky Creek
05 KCI Airport
06 RG - South

Kansas
07 US Penitentiary
08 JFK - Core
09 Heritage Park



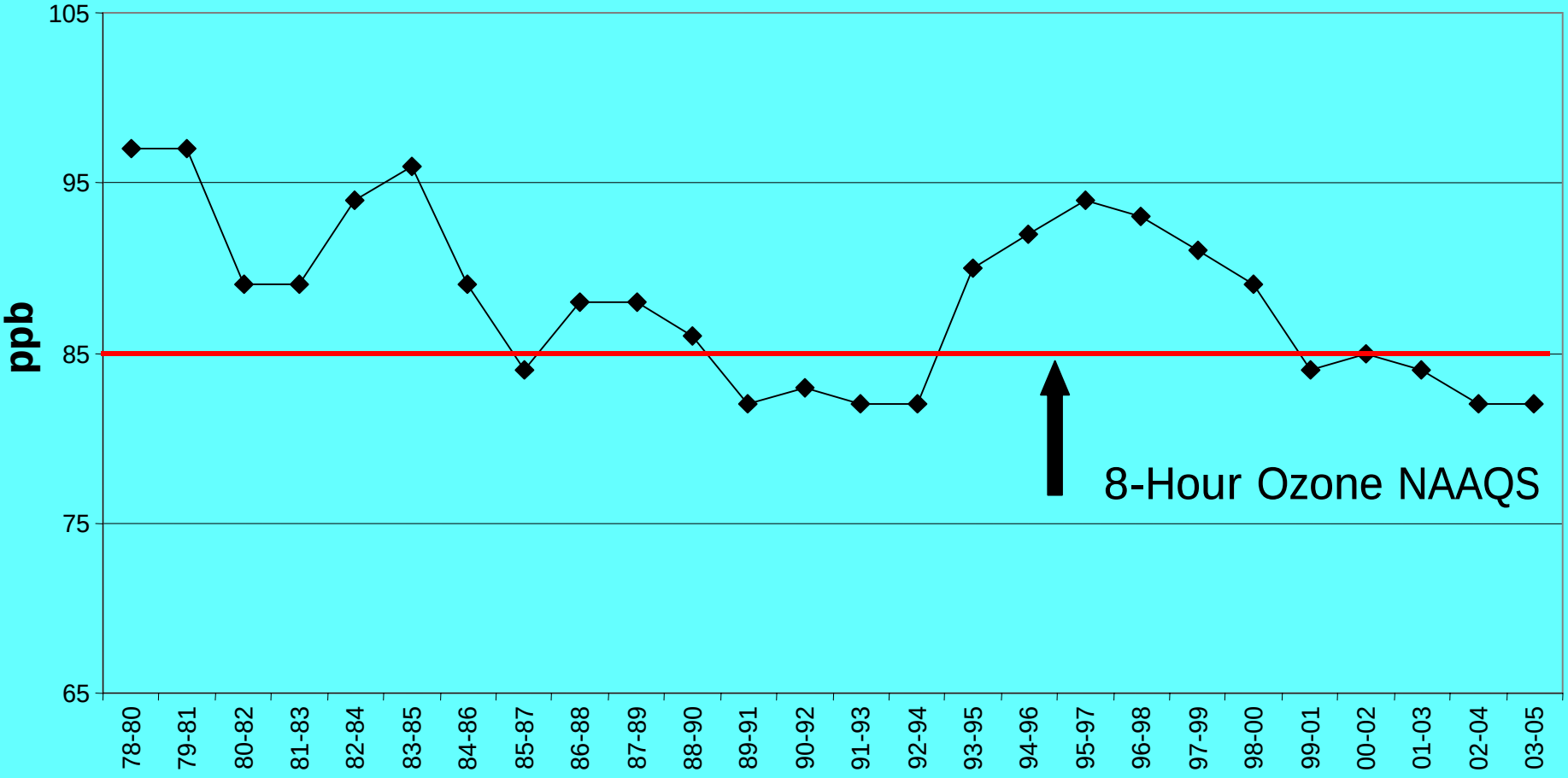
Missouri Department of
Natural Resources
Air and Land Protection Division
Air Pollution Control Program
Cartography by Thomas Adams 9/13/2004

Kansas City MSA 8-hour Design Values

	4th High 8-hr Average (ppb)					Design Value		
Missouri	**2001**	**2002**	**2003**	**2004**	**2005**	**01-03**	**02-04**	**03-05**
Liberty	79	87	88	71	88	84	82	82
Watkins Mill	73	83	85	67	79	80	78	77
Rocky Creek		91	88	69	87	na	na	81
RG South	72	83	82	61	81	79	75	74
KCI	79	85	76	70	86	80	77	77
Trimble				71	87			79
Kansas								
Wyandotte CO	76	80	84	63	79	80	75	75
U.S Penitentiary			82	66	77			75
Heritage Park			81	66	81			76

Kansas City MSA 8-hr Ozone Design Values

Design Value of Highest Site for Each 3-yr Period



Fine Particulate Matter

Monitoring data collected indicate that St. Louis is in violation of the annual NAAQS for $PM_{2.5}$. The annual standard is 15 ug/m^3, based on a three year average of $PM_{2.5}$ concentration at each monitoring site.

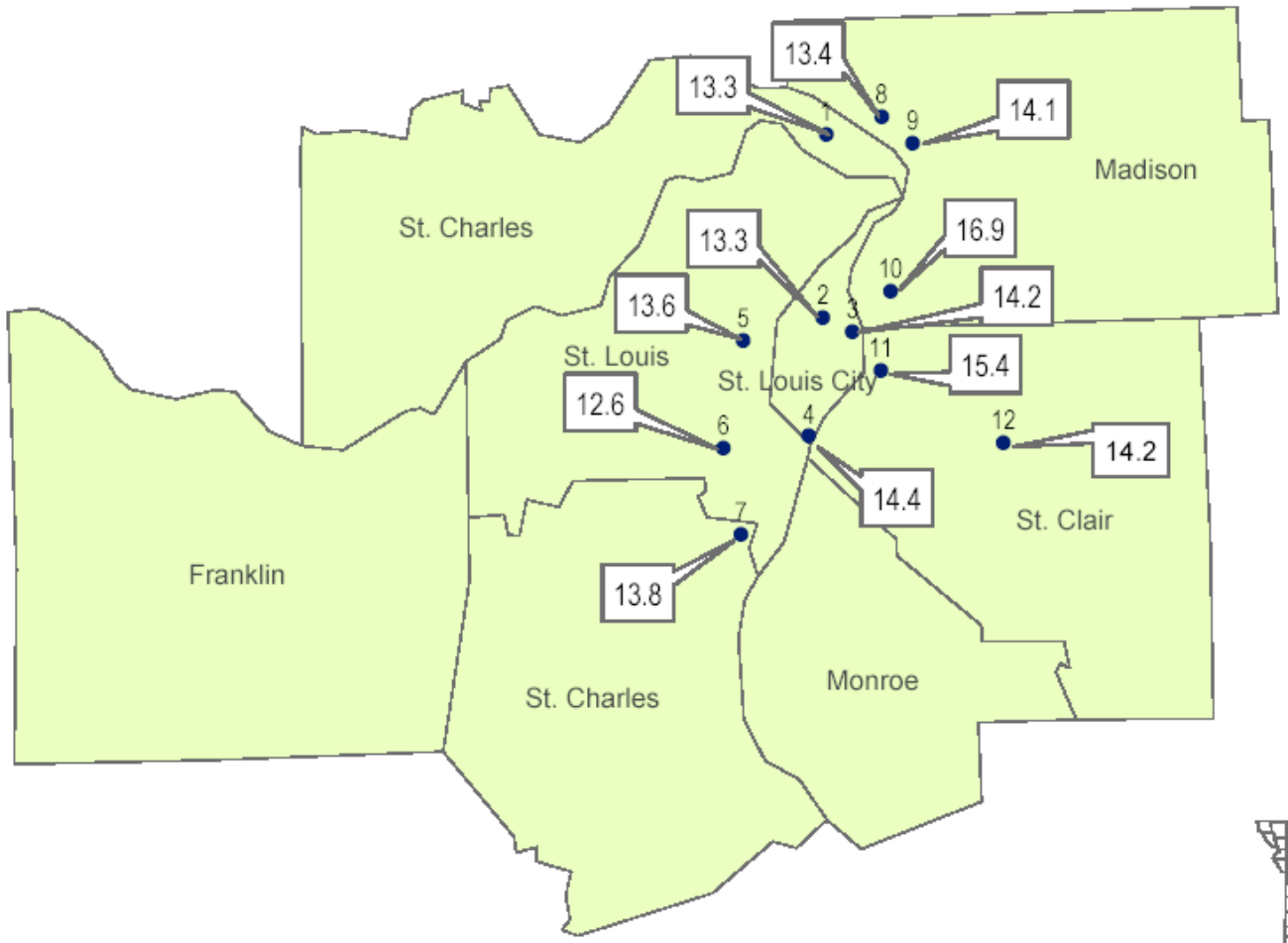
- Granite City, IL 16.9 ug/m^3
  E. St. Louis, IL 15.4 ug/m^3

- Missouri side of St. Louis, annual averages have steadily decreased since 1999

1999-2001	Blair St.	16.3 ug/m^3
2000-2002	Blair St.	15.7 ug/m^3
2001-2003	Blair St.	14.9 ug/m^3
2002-2004	S. Broadway	14.4 ug/m^3

Spatial Distribution of PM2.5 in the St. Louis Area

2002 - 2004 Average Concentration in Micrograms per Cubic Meter



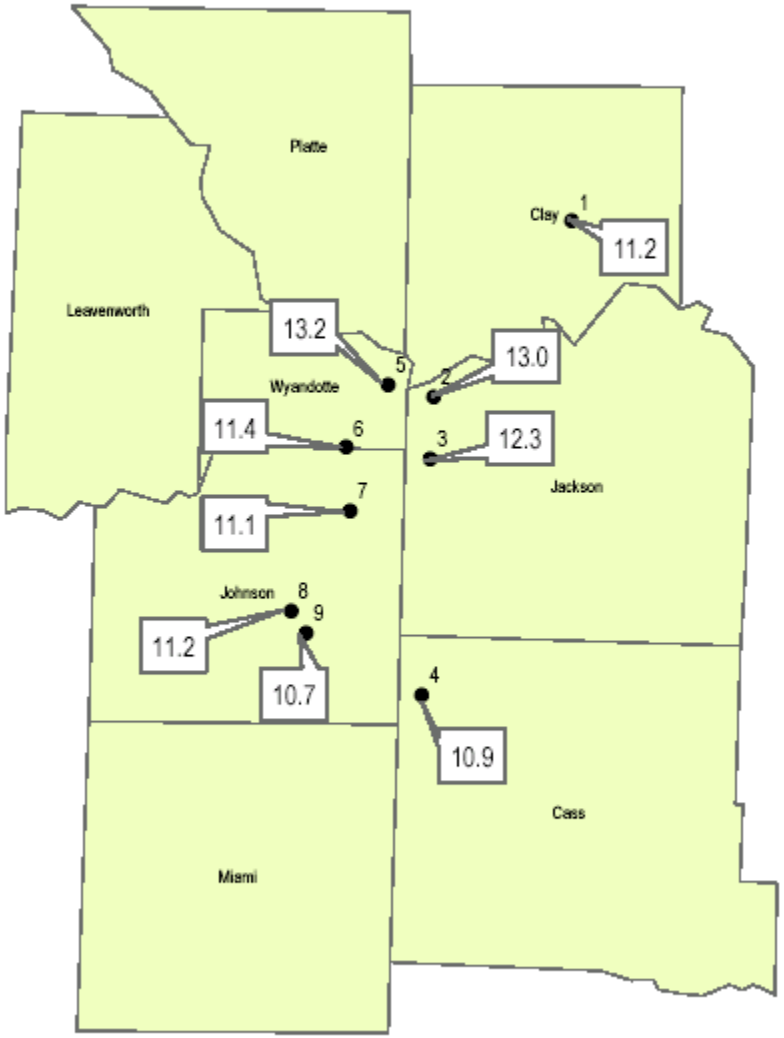
Site Name

1 West Alton
2 Margaretta
3 Blair Street
4 South Broadway
5 Clayton
6 Sunset Hills
7 Arnold
8 Alton
9 Wood River
10 Granite City
11 East St. Louis
12 Swansea

Department of Natural Resources
Air & Land Protection Division
Air Pollution Control Program
(Patricia Malire 03/21/05)

Spatial Distribution of PM2.5 in the Kansas City Area

2002 - 2004 Average Concentration in Micrograms per Cubic Meter



Site	Name
1	Liberty
2	Troost
3	UMKC
4	RG-South
5	JFK
6	Highland
7	Justice Center
8	Oxford
9	BlackBob

N

0 5 10 20 Miles

Department of Natural Resources
Division of Environmental Quality
Air Pollution Control Program
(Prepared by Patricia Mairo 09/07/05)

Particulate Matter (PM_{10})

The 24-hour PM_{10} NAAQS standard is 150 ug/m^3.

- There are two sites, North Market in St. Louis and Carthage, are in violation of the PM_{10} 24-hour standard. Both sites have shown improvement since 2003, although the St. Louis North Market site continues to record exceedances occasionally.

- By court order, EPA is revising the NAAQS for PM_{10}. The PM_{10} standard used in the past double-counts the fine particulate fraction and will be replaced by a PM Coarse standard. The new standard will regulate particles between 2.5 and 10 micrograms in diameter.

Revised $PM_{2.5}$ Standards

- The EPA is considering changing the levels of the $PM_{2.5}$ standards. By court order, a rule will be proposed in December 2005 and finalized in September 2006.

- Based on the EPA Review Team's recommendations, the revised standard will likely be lower than the current standard of 15 ug/m3.

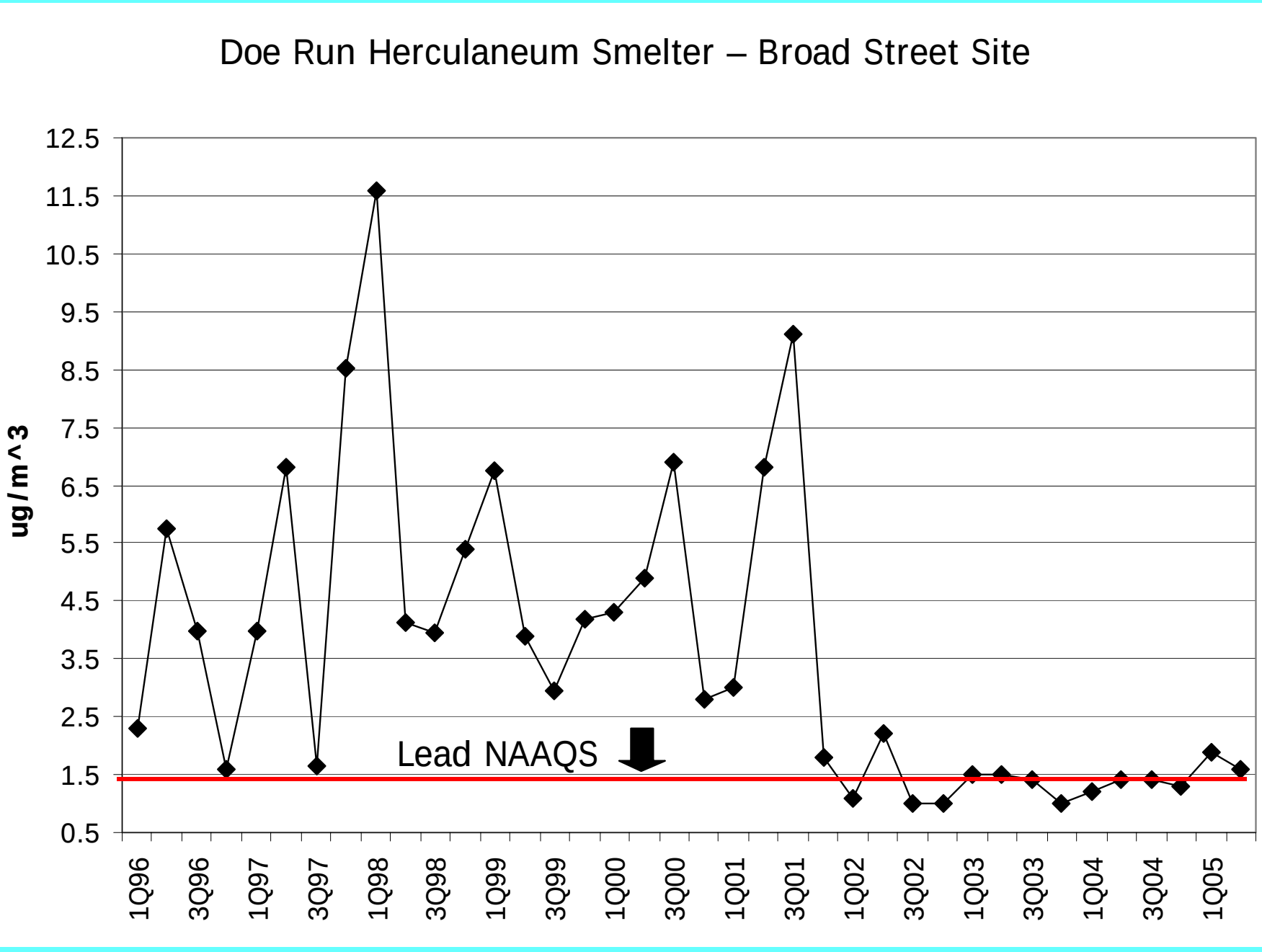
Lead - Doe Run Herculaneum Smelter

The quarterly lead standard is 1.5 ug/m^3.

- After ten consecutive quarters in compliance with the standard, the Doe Run Broad Street site recorded a quarterly concentration of 1.9 ug/m^3 for the first quarter of 2005.

- A violation, 1.6 ug/m^3, was also recorded at the same site for the 2nd Quarter this year.

- Notices of Violation were issued to Doe Run for both quarters. Starting this quarter, Doe Run is implementing a production cap to reduce their emissions.


Doe Run Herculaneum Smelter – Broad Street Site
ug/m^3
12.5
11.5
10.5
9.5
8.5
7.5
6.5
5.5
4.5
3.5
2.5
1.5
0.5
Lead NAAQS
1Q96
3Q96
1Q97
3Q97
1Q98
3Q98
1Q99
3Q99
1Q00
3Q00
1Q01
3Q01
1Q02
3Q02
1Q03
3Q03
1Q04
3Q04
1Q05

Hazardous Air Pollutants

APCP also regulates 188 Hazardous Air Pollutants, also known as HAPs. HAPs are pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive or birth defects.

Examples of HAPs and sources include:

benzene - gasoline

formaldehyde - combustion, biogenics

acetaldehyde - vehicles, volatile organic sources

perchlorethlyene - dry cleaning facilities

others include dioxin, asbestos, toluene, and metals such as arsenic, mercury, chromium, and lead compounds.

HAPS/Air Toxics Monitoring

The Air Pollution Control Program has been conducting ambient air sampling for various hazardous air pollutants. Sampling near Concentrated Animal Feeding Operations (CAFO) continues.

During 2001 through 2003, air toxics sampling as part of the Community Air Project (CAP) in St. Louis was conducted, in which local citizens worked with EPA and APCP to identify compounds of concern.

At the conclusion of the CAP, St. Louis was chosen as one of the locations for National Air Toxics Trends monitoring, as a beginning to track air toxics on a national scale.

Hydrogen Sulfide

- There are two state standards, 30 ppb, not to be exceeded over two times in any five-day period, and 50 ppb, not to be exceeded over two times in any calendar year.

- Since September 1st, 2005 there have been several instances of high Hydrogen Sulfide (H_2S) concentrations at the Mercer site (CAFO).
    - On September 1st and 2nd three exceedances of the State standard were monitored, consitituting a violation.
    - Two more exceedances were monitored on September 7th, one a high of 58 ppb.

- A NOV has been issued to Premium Standard Farms for this violation.

Summary

- Due to mild weather in summer 2004, the 8-hr ozone design value in St Louis NAA has decreased from 92 ppb in 2003 to 86 ppb. The number of sites in violation has reduced to two from eight sites.

- The design value for $PM_{2.5}$ in St Louis is 16.9 ug/m^3 recorded at Granite City site.

- Additional controls are necessary to achieve the 8-hr ozone and $PM_{2.5}$ standards. We are working with IEPA, DOT, local planning, and stakeholder to develop control strategies for the ozone and $PM_{2.5}$ SIPs which are due June 2007 and April 2008, respectively.